

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 1079

VERIFICATION OF ROCKWELL SUPERFICIAL
N AND T SCALE HARDNESS TESTING MACHINES

1st EDITION

May 1969

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BRIEF HISTORY

The ISO Recommendation R 1079, *Verification of Rockwell superficial N and T scale hardness testing machines*, was drawn up by Technical Committee ISO/TC 17, *Steel*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question led to the adoption of a Draft ISO Recommendation.

In January 1968, this Draft ISO Recommendation (No. 1354) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Austria	Greece	Poland
Belgium	Hungary	South Africa, Rep. of
Canada	India	Spain
Chile	Israel	Sweden
Colombia	Italy	Switzerland
Czechoslovakia	Korea, Rep. of	Thailand
Denmark	Netherlands	Turkey
France	New Zealand	U.A.R.
Germany	Norway	United Kingdom

Two Member Bodies opposed the approval of the Draft :

Romania
U.S.A.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in May 1969, to accept it as an ISO RECOMMENDATION.

VERIFICATION OF ROCKWELL SUPERFICIAL N AND T SCALE HARDNESS TESTING MACHINES

1. SCOPE

This ISO Recommendation applies to the verification of testing machines for determining Rockwell superficial hardness in accordance with ISO Recommendation R 1024, *Rockwell superficial hardness test (N and T scales) for steel*.

It describes the indirect method which is suitable for machines in service, and the direct method which is suitable for the initial verification of new machines by the manufacturer and for the verification of rebuilt machines.

2. DIRECT VERIFICATION

Direct verification involves

- (a) verification of the load-applying mechanism (see clause 2.1),
- (b) verification of the indenter (see clause 2.2),
- (c) verification of the measuring device (see clause 2.3).

Before verification is carried out, certain details of the testing machine should be checked (see Annex A).

2.1 Verification of the load-applying mechanism

2.1.1 The verification of the load-applying mechanism at the required loads should be carried out either by means of standardized weights (masses) or by means of an elastic device or proving levers.

2.1.2 The preliminary load and each total load should be measured and, wherever possible, this should be done at not less than three positions of the plunger throughout its range of movement.

2.1.3 The loads should be measured by one of the following three methods :

- (a) balancing against standardized weights (masses) accurate to $\pm 0.1\%$;
- (b) balancing against a load, accurate to $\pm 0.2\%$, applied by means of standardized weights (masses) with mechanical advantage;
- (c) measuring the applied load by means of the deformation of an elastic device which has been previously calibrated to an accuracy of $\pm 0.2\%$.

2.1.4 Three readings should be taken for each load at each position of the plunger (see clause 2.1.2). Immediately before each reading is taken, the plunger should have been moved in the same direction as during testing.

2.1.5 Each reading of the preliminary load before application and after removal of the additional load should be

$3.00 \pm 0.06 \text{ kgf}$

Each reading of the total load should be

$15.0 \pm 0.1 \text{ kgf}$

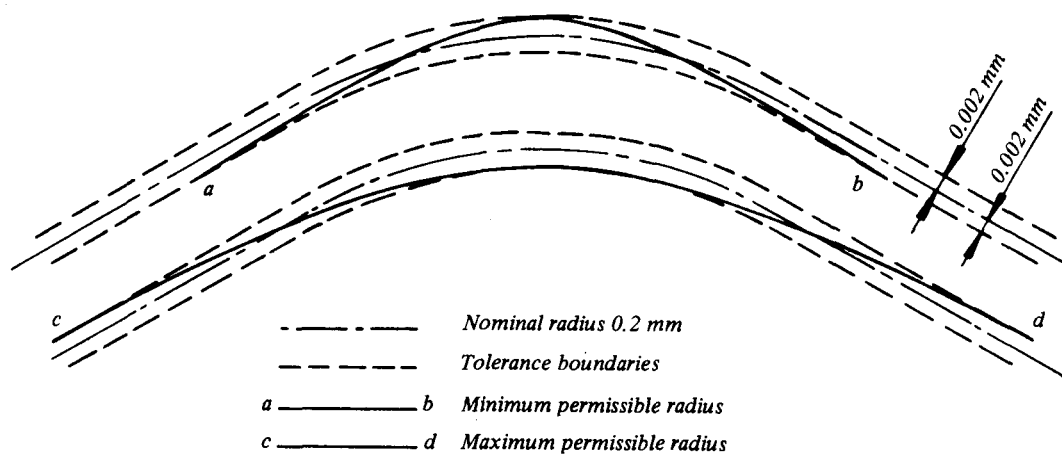
$30.0 \pm 0.2 \text{ kgf}$

$45.0 \pm 0.3 \text{ kgf}$

2.2 Verification of the indenter

2.2.1 *N* scale

- 2.2.1.1 The verification of the form of the diamond cone can be made by direct measurement or by measurement of its projection on a screen. The verification should be made at not less than four sections.
- 2.2.1.2 The diamond cone should have an included angle of $120 \pm 0.5^\circ$ and should have its axis in line with the axis of the indenter within 0.5° . The tip of the cone should be spherical with a radius equal to 0.200 mm. The contour of the whole of the tip should not depart by more than 0.002 mm from the theoretical profile (see Figure, below). The surface of the cone should blend in a truly tangential manner with the surface of the spherical tip.



FIGURE

- 2.2.1.3 The hardness values given by the testing machine do not depend only on the dimensions given in clause 2.2.1.2, but also on the surface roughness and the position on the crystallographic axes of the diamond, and the seating of the diamond in its holder.

For this reason, a performance test is considered necessary. The indenter should be used in a standardizing machine, in which the load applied and the measuring device can be verified by fundamental measurement.

An indenter should be rejected if, during the performance test, the hardness values obtained differ by more than 1 Rockwell superficial unit (in the range 40 to 80 HR 30 N) from those of the standardized blocks calibrated with an accepted indenter.